REMARKS

This amendment is responsive to the Final Rejection of November 23, 2010. Reconsideration and allowance of claims 2-4 and 8-18, and 21-25 are requested.

The Office Action

Claims 4, 15, and 21 stand rejected under 35 U.S.C. § 112, second paragraph.

Claims 1-4, 8-12, 14-16, 18, and 21-25 stand rejected under 35 U.S.C. § 103 over Wu (Thesis) as modified by Weese (Springer Article) as further modified by Holten-Lund (ACM Article).

Claims 13 and 17 stand rejected under 35 U.S.C. § 103 over Wu as modified by Weese, as further modified by Holten-Lund, as further modified by Pelletier (US 6,560,476).

The Present Amendment Should Be Entered

Claim 15 has been amended to incorporate all of the subject matter of its parent claim 1 and to correct the 35 U.S.C. § 112 issue in the manner suggested by the Examiner. Because a dependent claim is read as including all of the subject matter of its parent claim, it is submitted that amending claim 15 to place it in independent form raises no issues that would require further search or consideration.

Moreover, for the reasons set forth below, it is submitted that claim 15 distinguishes patentably over the references of record. Hence, claims 2-4, 16-18, 21-23, and 25 dependent therefrom are allowable based on their dependency on claim 15 and no issues requiring further search or consideration are raised.

Finally, the 35 U.S.C. § 112 issues in claims 10 and 21 have been addressed as suggested by the Examiner.

Accordingly, it is submitted that this amendment should be entered as raising no issues that would require further search or consideration and as placing the application in condition for allowance, or as reducing the issues on Appeal.

The Claims Distinguish Patentably Over the References of Record

First, it is asserted that the references combined by the Examiner are for different purposes and function in different ways, to achieve a different end result. It is submitted that the combination created by the Examiner is in no way motivated by the references themselves.

Wu is concerned with the recognition and localizing of objects by an autonomous robot (page 1, starting at line 1). To make this recognition, Wu deconstructs a 3D object (Figure 1.1(a)) into constituent parts (Figure 1.1(b)) which constituent parts are expressed as generic shapes or geons (page 2, line 9).

To deconstruct the object, Wu places a geon within the outline of the unknown object (Figure 4.9(a)). The geon is expanded (Figure 4.9(b)) until it just fits within the unidentified object. Note that it is important that the geon not be distorted beyond one of the defined basic geon shapes upon which the robot bases its identification. Once the first geon is fit, without distortion, the leftover portion of the structure to be identified is fitted with another geon which is expanded to match its shape, without becoming disformed outside of one of the basic geon shapes. Finally, Wu puts these two geons together and adjusts the triangular mesh which defines their surfaces to be continuously deformed at the intersection (Figure 4.9(c)). See also Wu, page 56, starting at line 7.

In this manner, Wu determines local surface information without the frustration of having to choose a crucial stopping condition (Wu, page 60, line 7).

Weese relates to a segmentation method that embeds an active shape model into an elastically deformable surface model. This technique is described in the present application starting on page 1, line 24, page 8, line 29, and page 9, line 6. More specifically, as pointed out in Section 2.4 of Weese, in a first step, a shape model is scaled and oriented with respect to a current mesh configuration, e.g., with a point-based registration. In a second step, the vertex coordinates and the weights are updated using external energy constraints (Weese, Section 2.2) and internal energy constraints (Weese, Section 2.3).

It is submitted that there is no motivation or teaching in either Wu or Weese that would lead one to combine the two. First, Wu needs to retain the basic geon shapes. The elastic deformation of Weese, if applied to the geon being

configured in Figure 4.9(b) of Wu, would distort the initial geon model into a non-geon shape. Moreover, the balancing of the internal and external energy would violate Wu's clear teaching that the frustration of choosing a crucial stopping condition is avoided. Because Wu and Weese are going in different directions, for different purposes, to achieve different end results, it is submitted that the combining of these two references is only motivated by the present claims and not the references themselves.

Holten-Lund is not cited as and does not cure these shortcomings of Wu and Weese. First, due to the poor image quality of Holten-Lund, it is unclear what it measured in Figure 9. Perhaps, if the Examiner's copy of this reference is more legible, e.g., if there are demarcations on the pictures which illustrate what angle, dist 1, and dist 2 are referring to. If these numbers are indeed measurements of a joint structure, it is not clear where in Wu or Weese there is any teaching that such measurement is wanted or desirable. The Examiner indicates that Holten-Lund cuts away portions of the bone, but is unclear what claim calls for such cutting away, or where either Wu or Weese teach that such cutting away would be advantageous.

Accordingly, it is submitted that Wu, Weese, and Holten-Lund go more to enablement, i.e., disclosing what is within the ability of those of ordinary skill in the art, but do not go to any teaching or motivation to combine.

Furthermore, even if combined, the references do not result in the structure or method of the claims.

Claim 8 calls for generating a deformable surface model of a surface of a training object, then extending the deformable surface model and then adapting the extended deformable surface model to a surface of the bone. By distinction, Wu conforms the ellipsoid of Figure 1.1(b) and Figure 4.9(b) to the bowling pin of Figure 1.1(a) and Figure 4.9(a). Wu subsequently fits the truncated conical shape to the leftover portions of the bowling pin. Thus, Wu teaches that the geons or geometric primatives should be individually fit to the object and then combined. This teaches away from the recitation in claim 8 of generating the extended deformable surface model first and then adapting the extended deformable surface model to the surface of bone. Neither Weese nor Holten-Lund were cited to address this shortcoming of Wu and, indeed, neither does.

Accordingly, it is submitted that **claim 8 and claim 24 dependent therefrom** distinguish patentably and unobviously over the references of record.

Claim 9 again calls for generating an extended deformable surface model and then adapting the extended surface model to the surface of the object of interest. Again, Wu teaches against fitting a compound model to an object of interest in favor of deconstructing a complex object of interest down into individual geons or geometric primatives. Neither Weese nor Holten-Lund were cited as nor cure this shortcoming of Wu.

Accordingly, it is submitted that **claim 9** distinguishes patentably over the references of record.

Claim 10 calls for extending a generated deformable surface model with additional geometric information and then deforming the extended surface model to fit the object of interest. Again, Wu teaches against this in favor of deconstructing the object of interest into geons or geometric primatives.

Claim 13 further calls for the surface model to include a sphere and a line. Rather than fitting a surface model which includes a sphere and a line to a vase, Figure 6.10 of Wu shows determining the surface of a base from a spherical geon model and a cylindrical geon model, the spherical and cylindrical models being, after fitting, combined into a model of the surface of the vase.

Accordingly, it is submitted that **claim 10 and claims 11-14 dependent therefrom** distinguish patentably and unobviously over the references of record.

Claim 15 has been placed in independent form including all of the subject matter of its parent claim 1.

Among other limitations, claim 15 calls for determining a rule which defines the selected geometric primitive and a method which fits the selected primitive onto the corresponding sub-part of the training object. The Examiner refers the application to page 112, Section 2, and Figure 2 of Holten-Lund. This Section of Holten-Lund illustrates the technique which Holten-Lund performs, but makes no mention, suggestion, or teaching of determining a rule.

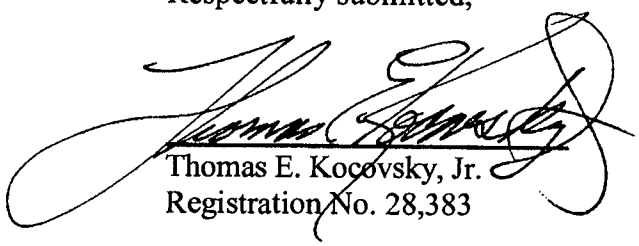
For this and other reasons previously set forth in conjunction with claim 1, it is submitted that **claim 15 and claims 2-4, 16-18, 21-23, and 25**

dependent therefrom now distinguish patentably and unobviously over the references of record.

CONCLUSION

For the reasons set forth above, it is submitted that claims 2-4, 8-18, and 21-25 distinguish patentably and unobviously over the references of record and comply with the other statutory requirements. An early allowance of all claims is requested.

Respectfully submitted,



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